Ookla response
to
Public consultation on the draft BEREC Guidelines detailing
Quality of Service Parameters

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This document has been specifically prepared in response to the Public consultation on the draft BEREC Guidelines detailing Quality of Service Parameters (BoR (23) 179).

The document is submitted on the understanding that the information contained within this document will be treated with the same care and attention that Berec treats its own confidential and proprietary information.

1. Introduction

The Ookla mission is to measure, understand, and help improve connected experiences. We are very happy to add some feedback to this assessment and would be happy to add additional insight or comment in the future if needed.

This document is structured to give the reader some background on Ookla who we are and why we have responded. It contains
- a high level introduction to Ookla
- direct responses to the consultation questions
- some additional items which may be of interest

At any time Ookla is open to discussing our test methodologies, practises and results with a relevant audience.

James Carroll - November 10th 2023

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2. Ookla background and solutions

Founded in 2006, Ookla is part of Ziff Davis (NASDAQ: ZD), an American media, internet information and services company. Headquartered in Seattle, Ookla is the global leader in mobile and fixed broadband network intelligence, testing applications, and related technologies. The company's flagship platform, Speedtest®, provides invaluable quality of service (QoS) insights into the performance, quality, and accessibility of networks worldwide. These crowdsourced QoS insights are combined with deep RF and lower-layer measurements collected from controlled drive/walk testing plus real-world consumer quality of experience (QoE) measurements that show a real-world view of popular activities like video streaming, video conferencing, web browsing, gaming, and more. Together, these complementary datasets provide a holistic view of network performance designed to improve connectivity for all.

Ookla's core mission includes providing unbiased, accurate, transparent, and independent data on the state of the internet to three distinct constituencies: consumers, the telecommunications industry, and governments and industry associations. Consumers make informed choices when they have accurate information on the quality and performance of their internet connections. The telecommunication industry relies on Ookla's benchmarking analytics to optimize and improve their networks and better position their services to consumers. The industry also leverages the excellent reputation of Ookla's data to validate claims used in marketing campaigns.

2.1 Points of note about Ookla and Speedtest®

- As official members of the ITU-T (Study Group 12), Ookla partners with leading global operators, test and measurement companies, infrastructure and hardware providers, network analytics providers and regulators to help develop and define quality of service (QoS) and experience (QoE) standards.
- Ookla is the exclusive provider of global network performance data to GSMA Intelligence (GSMAi), a trade body that represents the interests of mobile operators worldwide, uniting more than 750 operators with almost 400 companies in the broader mobile ecosystem.
- As a widely adopted consumer internet intelligence standard, Ookla fixed and mobile data is used by the U.S. Federal Communications Commission (FCC) for internal analysis, reports to Congress and public documents on the status of the telecommunications marketplace.
- Ookla's methodology is globally recognized and accepted as a standard way to measure speed performance having been adopted by more than 400 enterprise clients worldwide.

- The Ookla consumer test methodology is designed to represent real user experience and our test platform has access to more than 15,000 servers worldwide and has conducted over 50 billion tests to date.
- Ookla is fully GDPR compliant and transparent in its data collection methodologies.
- Ookla has a strong Data Science team and applies rigorous data science and filtering to ensure the analyzed results are an accurate and true reflection of real-world performance.
- As an independent third party, Ookla is able to provide validated endorsements of network performance. Ookla does this in more than 80 countries, substantiating marketing claims for more than 120 operators.

3. Ookla's response to Berec consultation

3.1 Specific Answers to Questions asked

Please note, as a crowdsourced Internet test and measurement company, Ookla's responses relate only to the components within the consultation which we consider ourselves to be experts in: namely, the consumer testing of internet communications.

3.1.1 *Do the existing Guidelines detailing Quality of Service (QoS) parameters assist stakeholders? Are there any challenges to implementing the Guidelines?*

In our experience, one of the key difficulties industry bodies and specifically regulators have is convincing citizens and consumers to use the services that they have at their disposal.

Curating, maintaining and servicing an international crowd is a difficult task. Many regulators launch applications, test programs, policies and expensive data collection apparatuses only to find that these gain limited traction and do not produce the desired results. Industry companies, like Ookla, offer some of these very services internationally in a unified manner to all on the globe and are often the first port of call for citizens and consumers to test their connectivity.

This tends to produce a number of different issues:
- Consumer confusion, where the consumer expectations are being driven by their interaction with services like Ookla Speedtest, but the regulatory decisions are being driven by other data points.
- Methodological mismatch, in which different services are testing similar items in different ways leading to market confusion. For example a consumer trying to complain that their service is impacted using Speedtest results but being told these results need to come from a different solution to be valid.
- Low test volumes for regulator-deployed solutions.

Ookla notes that the consultation and 'BoR (22) 72 Net Neutrality Regulatory Assessment Methodology' both have significant references for a desire to harmonize test methodologies. It is the belief of Ookla that test characteristics which allow for a number of different methodologies to be deployed depending on what is most relevant in a market would be positive. In our experience, restrictive guidelines tend to lead to low adoption and low consumer interaction.

3.1.2   Which points in the Guidelines could be more detailed or clarified?

Network availability is mentioned as a key characteristic of Mobile; however, there is not clarity as to how such a metric can be measured. Will crowdsource metrics be used to understand true coverage as opposed to advertised coverage?

There is a reference to "Probability of successful connection in an area covered by the network" as a criteria but no explanation of a desired way to measure that.Can or should this be monitored on an ongoing basis by crowdsource metrics or should this be on a scheduled drive test scenario or should this be based upon operator reported data?

3.1.3   Which parameters, listed, or even not listed, in Annex X of EECC, mostly assist end-users in evaluating the quality of service?

BoR (22) 72 Net Neutrality Regulatory Assessment Methodology lists throughput both up and down along with packet loss, latency, loaded latency and jitter in its definitions.

We believe that throughput metrics are very important for reasons other than net neutrality.For example, identifying unserved or underserved areas continues to be important, and throughput measurements play an important role in this effort. However, the connectivity landscape is changing, and we are at a critical point in the evolution of networks. For many consumers, access to networks is no longer the primary barrier to enjoying improved connectivity. Rather, the conversation is now shifting from QoS to QoE, with the goal of ensuring that any network optimization or expansion is actually impacting real-world consumer experience positively. In this context, understanding the latency under load is one of the most important future metrics in expanding QoS towards QoE.

3.1.4   Do you have any other relevant comment?

Following up on the point above, QoE testing directly to key services or testing towards specific server end points of relevance is going to be increasingly important over the coming five years.

As concessions need to be made in test scenarios for the ever-changing and sometimes proprietary nature of these services, a framework to allow for

methodologies of QoE testing to be adopted by regulators and government bodies would be advantageous.

In addition to the depth and breadth of RF and QoS measurements that Ookla offers, the company's complementary QoE insights show how network performance is actually impacting key tasks such as web browsing, video streaming, video conferencing, gaming, and more. This is the next critical frontier for networks and Ookla: uniting technical insights with consumer experiences, QoS with QoE data.

3.2   Parameter Specific Comments

Parameter	
Network Availability	Ookla Availability metrics represents the percentage of users who spend the majority of their time on a given cellular technology and network. This is aggregated by geography and time.
Network Outages	Available via the Ookla downdetector tool
Downlink + Uplink Throughput	Download and Upload speed measures how quickly you can pull or push data from a server on the internet to your device. Most connections are designed to download much faster than they upload. This is because the majority of online activity, like loading web pages or streaming videos, is driven by downloading content. Download and Upload speeds are measured in megabits per second (Mbps).
Latency	Latency is measured in a number of different ways depending on the test scenario and the desired outcome. For more details you can visit here to see all the different latency types.
Jitter	
Loaded Latency	
Web page loading	Page Load Time is measured from the point when the page begins to load until all elements are fully loaded for a number of globally significant web properties.

Public Ookla methodologies available here

4. Conclusion

It is one of Ookla's core beliefs that consumer-collected data points have a high value in the validation of services and deployed services. These data points should be gathered to a defined methodology, they should be independent of service providers and they should be trustworthy. As a test and measurement service that operates globally, we have a strong and robust place in providing tools and data to assist regulators. To this end, we are always keen to engage with regulatory bodies and standards bodies to make sure that the scope of regulations is inclusive to all possible data sources. We have found that overly prescriptive regulations often lead to lower adoption and we urge Berec to consider the speed of industry as opposed to the speed of regulation in any new regulations they publish.

Appendix 1

1. Ookla capabilities for regulators and governmental bodies

In many respects, Ookla created the standard for consumer-initiated network performance testing measurements on the web, natively on mobile devices and computer operating systems, and embedded on routers and industrial equipment.

Ookla is the preferred provider of network performance data for many regulatory bodies and trade organisations worldwide. As people and businesses rely more heavily on the internet for education, health and entertainment, access to broadband and mobile internet services doesn't just drive economic growth — it also impacts public safety and quality of life.

That's why providing universal access to fast, reliable internet service is a key priority for most regulators and governments around the world. Ookla® is fiercely committed to measuring the performance and availability of the internet worldwide and reporting on it transparently.

Regulatory bodies need definitive information to make informed policy decisions. A foundation of good governance is ensuring that policy makers have access to the highest-quality, most comprehensive data available in the market. While individual operators' standards for reporting on network performance and coverage may vary, Ookla provides independent and comprehensive data on network speeds, latency, availability, coverage and other key performance metrics.

Good governance is also predicated on policy makers being excellent stewards of public funds. When evaluating where networks need to be improved, it is imperative that regulators leverage unbiased information from private data sources with proven methodological practises.

1.1 How Regulators Use Ookla Data

- Map nationwide broadband service availability and mobile coverage to analyse geographic trends and see how people are or are not connecting with networks
- Access network coverage and consumer-initiated performance data that can be compared against telecommunications service providers' declared coverage maps to validate network claims
- Understand the quality, performance and location of existing networks, how operators are meeting the service obligations of their current agreements and where infrastructure investments are needed
- View how mobile networks perform by operator, spectrum band and device

- Access historical network performance and coverage data to understand trends and progress over time
- Inform policy and spectrum allocation decisions
- Track the rollout and adoption of new spectrum
- Analyse networks in high-traffic areas, popular venues and public spaces to ensure public safety
- Measure a country's network development over time, benchmarked against other countries, regions and the world

1.2 Relevant References and Relationships

Ookla enjoys long-standing client relationships with internet service providers, mobile network operators, regulators, and other enterprises in over one hundred (100) countries, including large multinational group telecommunications operators, content providers, device manufacturers, and operators serving small and large nations alike.

International Telephone Union - ITU

Study and Expert Group partnerships
As official members, Ookla partners with leading global operators, test and measurement companies, infrastructure and hardware providers, network analytics providers and regulators to help develop and define policies, access technologies and quality standards.

ITU-T (Study Group 12)

ITU-T SG12 is the expert group responsible for the development of international standards on performance, quality of service (QoS) and quality of experience (QoE).

Our data has been used in ITU publications - for example the Measuring the Information Society Report - https://www.itu.int/pub/D-IND-ICTOI-2018

GSMA

Ookla has a Data and content partnership with GSMA Intelligence. GSMA intelligence is the research and publication wing of the GSMA. Ookla is the exclusive provider of global network performance data to the GSMAi. Examples of content produced using our data are:

GSMA Connected Society - The State of Mobile Internet Connectivity
https://www.gsma.com/mobilefordevelopment/wp-content/uploads/2019/07/GSMA-State-of-Mobile-Internet-Connectivity-Report-2019.pdf

The Mobile Economy:
https://www.gsma.com/r/mobileeconomy/3/

The World Bank

Ookla works with the World Bank Data Council on projects with real stakeholders and across the globe. The relationship is project based with World Bank researchers around the globe having access to Ookla Intelligence data on a per project basis. These projects range from telecommunication to societal development, to event tracking and projection. These projects are a mixture of academic, private governmental delivery and publication.

Currently, there are numerous world bank projects active based on Ookla data. They include:
- Broadband mapping and planning for a 5-year strategy for a large Eastern European country.
- Tracking internet patterns during the Covid pandemic in Southeast Asia
- Looking at West African internet transformation
- Tracking global movement to home work during the pandemic

Ookla can provide contact details of its Regulatory clients on request, in case Berec wishes to discuss Ookla solutions, its capabilities and use cases adopted by them.

2. Items of potential interest

2.1 Consumer focus

Many of the fundamentals of end-user internet speed throughput testing were designed, implemented and perfected by Ookla. As a company that has been the market leader in crowdsourced internet metrics for over 15 years, we believe that part of our success is based on the privacy and respect that we show our loyal consumers. Speedtest® in all its forms is used on 100s of millions of devices each year, this global reach is unprecedented for an application which at its heart informs end-users with simple to digest KPIs relevant to them. This relationship with our consumers also ensures that end users engage with Speedtest® at times and in places where internet connectivity is relevant to them.

2.2 Adherence to privacy legislation

Ookla's data collection philosophy demands strict adherence to protecting the privacy of the users of Speedtest® and other applications. Our consumers are informed and fully aware of how we collect data and we provide consumers with the

ability to disable this in our Application. We license Consumer-sourced datasets, which rely only on Ookla-branded products for collecting performance and coverage measurements.

Ookla has always been committed to digital privacy. We have designed our privacy controls to protect the people who put their trust in Speedtest and Downdetector. We have [strict privacy measures](https://www.ookla.com/shared/privacy) in place, including strict adherence to international privacy regulations on how we handle personal information.

2.3   Multi Server Testing

Ookla's test methodology aims to be the most accurate measure of a user's real-world network performance. To that end, we have fully enabled multi-server testing on our web, desktop and mobile Speedtest platforms. Testing simultaneously to multiple servers removes the dependency on a single server to fully saturate a connection and measure a user's maximum download throughput capacity.

Multi-server testing is important because ultra-high-speed connectivity services (such as fiber or 5G) require higher-capacity servers in order to generate enough traffic to saturate an end-user's connection. Peering relationships or cross-connectivity between providers can also be a bottleneck for internet speeds, so a single server's performance and the proximity of the selected server are both factors that can impact the accuracy of a network test. To mitigate these issues, our applications can now test to multiple servers in parallel to generate sufficient traffic to saturate the end-user's connection.

2.4   Testing high speeds

The ability to measure a network's full capacity is especially critical with modern network speeds increasing rapidly across connection types like 4G, 5G and fibre broadband. Speedtest® is capable of measuring the throughput of a 5G connection and other gigabit-and-beyond speeds. Speedtest® uses a client and server testing engine that dynamically scales the number of connections to the server in order to saturate and accurately measure client-side connections up to 10 Gbps. This allows Ookla to measure the full extent of real-world performance and overcome the effects of network bottlenecks such as TCP slow start (a transmission control protocol that avoids sending more data than the network is capable of forwarding).

2.5   Loaded Latency

Loaded latency measures latency under a large load. We represent both download loaded latency and upload loaded latency and this metric gives an approximation of how a network performs with poor buffer management or if a background app is using a lot of bandwidth.

2.6   Consumer QoE

Crowdsourced from billions of daily samples on hundreds of millions of consumer mobile devices worldwide, Ookla's powerful combination of network quality of service (QoS) and quality of experience (QoE) analytics helps operators understand and improve their networks.

Analyze in-depth consumer experience metrics for multiple services, including web browsing, streaming video, gaming, and video conferencing. Based on active tests through the SDK, this module allows you to:

- Visualize real-world user experience KPIs with detailed geographic location information
- Identify areas of weakness or strength
- Identify pain points that matter most to users, such as poor video playback or gaming latency
- Correlate user experience with radio environment, throughput, or latency
- Filter results by device, device capabilities, network technology, radio cells, locations, time, and more